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NOTE ON THE SOLUTION OF PROB. 374, BY R. S. WOODWARD.—That the probable error in a system of errors of constant probability between the limits $\pm a$ is $\pm\frac{1}{2}a$, or one-half the maximum error, would appear to follow directly from the definition of the probable error, viz., that error which is as likely to be exceeded as not. The proof ordinarily given is this:

Let $\varphi(\varepsilon)$ = probability of error ε, and $\varphi(+\varepsilon) = \varphi(-\varepsilon)$. Then if all errors are included between the limits $+a$ and $-a$, and $\varphi(\varepsilon) = c$, a constant,

$$\int_{-a}^{+a} \varphi(\varepsilon)d\varepsilon = \int_{-a}^{+a} cd\varepsilon = 1\,; \text{ whence } c = \frac{1}{2a}.$$

The probable error for such a system of errors is the limit ρ determined by the equation $\int_{-\rho}^{+\rho} cd\varepsilon = \frac{1}{2}$. This gives $\rho = \frac{1}{4c} = \frac{a}{2}$.

That the probable error of an interpolated value is correctly given by the formula $0.25[1 - 2(\frac{t}{10} - \frac{t^2}{100})]^{1/2}$ may, however, be questioned. This expression is based on two assumptions, viz., 1st, that the errors of the tabular values are independent, 2nd, that the law of combination of these errors is the ordinary law of error.

The result, $\frac{2}{3}(0.25)^2$, for the probable error of an interpolated value is given without proof by F. G. W. Struve in *Arc Du Me'ridian, Tome I*, p. 94, with reference to 7 place logarithms.

Bessel, in *Astronomische Nachrichten*, No. 529, has also investigated this problem as applied to logarithms. His investigation assumes that the errors of the tabular values are independent; and the probable error of the interpolated value is made to depend on the special law of error which obtains in case two independent errors, each of constant probability between its limits of variation, conspire. Bessel's formulas make the probable error of an interpolated value less always than that of a tabular value.

[Because, in *writing* the interpolated value, there may be a maximum error of .5 of a unit of the last place figure, even when its calculated value is *exact*, and because the tabular values, from which the interpolated value is determined, may have a maximum error of .5 of a unit of the last place figure, which will, in general, cause the interpolated value to be in error as calculated which error may conspire with the error of writing; therefore the interpolated value, when incorporated into the table, must have a greater probable error than the tabular values from which it is deduced.—Ed.]

NOTE ON THE SOLUTION OF 372, BY PROF. D. V. WOOD.—There are two positions of the state bordering on motion—one in which the force μR acts up the plane; the other in which it acts down. Hence we find

$$\sin\theta = \frac{8\mu\sin\beta}{3\sin(\alpha+\beta) \pm 3\mu\cos(\alpha+\beta)}.$$